A Study on Operational Risk Management:

A Comparative Study on Selected Public & Private Sector Banks In India.

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ABSTRACT

The financial sector plays an important part in economic development, but in recent years, it has been witness to several complex events such as bankruptcies and financial institution failures, debt crises in key economies around the world. The situation has become extremely unpredictable, resulting in recession in major economies such as the United States and Europe. The Indian banking industry's development has accelerated. Over the last decade, it has been spectacular. It is clear from the increased rate of loan expansion and rising profitability and productivity comparable to developed-market banks, lower non-performing asset incidence, and an emphasis on Indian banking has become more vibrant and strong as a result of financial inclusion. Indian banks have begun to modify their policies their strategy for expansion.

Key Words— *Efficiency, Risk, Indian Banks*

1. INTRODUCTION

The banking sector's success or failure is determined by the operational efficiency of the banks. Operational efficiently is characterized as making the most of the resources available the Men, material, machine, and capital in conjunction employed to provide the most production is frequently referred as operational effectiveness it is commonly acknowledged that the efficiency of banks is critical to production of the economic system the luxurious and relaxing features it has become more critical as a result of the proliferation of banks sound and smooth, watchful and aware, accountable and responsible duty-bound, brave and truthful, fair and fearless, and law-abiding enduring despite any type of pressure Banks' relative efficiency is a matter of opinion.

1.1Need for the study

The present system of prudential accounting norms creates an unimpressive balance sheet classifying a major part of advances and loans as non-performing assets. The general fluctuation of interest rate affects interest rates reduces spread ratio and forces the banks to focus on profitability. Hence the policy adapted to the business strategies to identify and sustain various risks to maintain Capital adequacy and assets quality of the bank. In this connection the financial experimentation has been taken up for the last few years with an appropriate technique for the management of total balance sheet dynamically to meet the need of the banks is called Asset Liability Management(ALM), which is implemented in almost all the Indian banks. The major problems faced by the banks like recovery of loans, liquidity, and fluctuation of interest rate etc are also redress through the Asset liability management. Accordingly the attempt has been taken up to evaluate the changing scenario of the banks to identify and face the risks to maintain the quality of the asset by ensuring profit with the techniques of the Asset Liability Management. It also emphasizes to evaluate the usefulness of Asset liability management for the progress and the holistic development of the Indian banking sectors to improve the economic growth of the nation on the whole. Thus the study is titled as "A Study on Operational Risk Management: A Comparative Study on Selected Public & Private Sector Banks In India. is trying to explore the Asset Liability Management strategies the banks under consideration are adapting and to analyze its impact on the overall performance of the banks.

1.2 Data Base and Methodology

The complete study was based on the secondary data. The data for the study have been gathered from the Annual Reports and ALM reports of the chosen banks, reports from various sources of RBI such as RBI Bulletins, Banking Statistics - Basic statistical Returns, Statistical Tables concerning to Banks in India, tendency and growth of Banks in India, Indian Banks Association Bulletins(IBA), Publications and Seminar Papers of the National Institute of Bank Management, Base1 Committee Reports accessible by the Bank for worldwide agreement as well as additional existing publications in this area. Sites of RBI and chosen banks have likewise been used to accumulate the most up-to-date data. The collected statistics has been investigated with the assistance of SPSS (Statistical Packages for Social Sciences) software and MS Excel was used for this reason.

1.3 Research Design:

The study has built explorative research design which is as follows:

1.3.1 Title of the Study

The Study is titles as "A Study on Operating Efficiency: A Comparative Study of Selected Public and Private Sector Banks"

1.3.2 Objectives of the study

1. To evaluate the operational efficiency of the selected private and public sector banks in connection to the management of asset and Liabilities in line with Basel II norms.
2. To compare the profit orientation between the selected public and private sector banks.
3. To comment on the growth, progress and development of the selected public and private sector banks.

1.3.3 Scope of the Study

The scope of the study is restricted to selected Commercial Banks (i.e. Public Sector Banks and Private Sector Banks) in India.

1.3.4 Formulation of Hypothesis

T- Test: Test for significance difference between assets and liabilities of selected banks.

This t- test determines significance difference between average value of sensitive assets and liabilities of some particular banks. The hypotheses are as follow:

Null H0: There is no significant difference between operational efficiency (Ratios) of selected public banks and private banks

Alt H1: There is significant difference between operational efficiency (Ratios) of selected public banks and private banks

1.3.5 Selection of the Sampling Design:

Sample Size:

Present study restricted to ten bank units out of them five banks were chosen from the public sector and rest of five banks form new private sector banks based on their profitability, Market capitalization, Net Sales and Total Assets during the year 2021.

From Public sector Banks

1. State Bank of India
2. Punjab National Bank
3. Canara Bank
4. Bank of Baroda
5. Bank of India

From Private sector Banks

1. Housing Development Finance Corporation (HDFC)
2. Industrial credit and Investment Corporation of India (ICICI)
3. Axis bank
4. Kotak Mahindra bank
5. Youth Enterprise Scheme (Yes) Bank

1.3.6 Period of the Study

In order to analyze the changing perspectives, the study has been conducted for a duration of ten years, i.e. from 2010-11 to the year 2020-21. The base year has been taken as 2005 as in February 2005 Reserve Bank of India (RBI) issued first draft guidelines on Basel II norms and insisted the banks to adopt the norm, in this context the ten year period starting from 2011-12 onwards to 2020-21 was considered while analyzing the data to compare the profitability and overall performance of the selected banks.

1.3.7 Data Collection and Data Sources

The study based on secondary data, so it has taken from the various available sources. The secondary data collected from the Annual Reports and ALM reports of the selected banks, various publications of RBI such as RBI Bulletins, Banks Statistics related to Banks of India, etc.

1.3.9 Statistical Tools and Techniques used

For the current study, numerous tools or techniques have been used for analyzing the financial data. These may be classified as under:

1. Accounting Tools/Techniques
2. Statistical Tools / Techniques

1. Accounting Tools/Techniques

The Accounting Tools that are used for the evaluation of financial performance of various banks are as under:

[1] Ratio Analysis

[2] Trend Analysis

2. Statistical Tools / Techniques:

A few statistical tools/strategies have been used in accordance of the nature and demand of the study. The composed date is duly classified, formulated and evaluated by using appropriate statistical techniques. The statistics has been interpreted with the help of a range of tools and techniques like average, coefficient of variation, Rank analysis, diagrammatic and graphic presentation, F-test (ANOVA) and t- test etc. according to the need of the study and hypothesis have been tested at 5% level of significance.

2. Review of Literature

Satya (2006) in his paper titled “Efficiency Performance in Indian Banking—Use of Data Envelopment Analysis” assessed the relative performance of Indian banks from 1997 to 2004. Nine input variables and seven outcome variables are used in the analysis. The banking sector in India was segmented based on the following criteria: bank asset size, ownership status, and years of operation. Overall, the findings support the notion that foreign-owned banks were the most efficient and effective on average. New banks are more efficient than old banks, which are sometimes encumbered with old obligations the smaller the size, the better.

Banks are efficient worldwide, while huge banks are efficient locally. Furthermore, this research uncovers evidence of Efficiency indicators are concentrated among peer bank groups.

Malhotra (2011) in his paper "Evaluating the Performance of Commercial Banks in India" Examined the performance of Indian commercial banks between 2005 and 2009. This time span includes both the pre-credit-crisis and crisis periods. The article looks at the profitability, cost of intermediation, efficiency, banking system soundness, and industry concentration of both public and private sector Indian commercial banks. The empirical findings demonstrate that the Indian banking business has become more competitive. While the net interest margin has improved, the cost of intermediation has increased, and banks have responded by increasing their efficiency.

Deepti and Pulak (2012) in their paper titled "Structure, Conduct and Performance of Indian Banking Sector" stated that the structure-conduct-performance linkages in the Indian banking industry in the context of beginning of economic reforms in general and changes in policies and regulations of the banking sector in particular. In the post-reform era, notably within the last decade, there have been changes in the market structure of the Indian banking sector, as well as bank conduct and performance; however the changes have not been significant in every element. The study indicates that there are considerable inter-linkages between market structure, bank behavior, and financial performance using a panel dataset of 59 banks operating in India from 1999-2000 to 2008-2009 and the two-stage least squares (2SLS) technique of estimation.

Hassani and Ranjbaraki (2015) in their paper titled "Factors Affecting on the Operational Risks of Electronic Banking in Iranian Banking System 'Case Study of Isfahan's Sepah Bank "analyzed the factors affecting the operational risk in e-banking of Isfehan's Sepah Bank. The necessary information in the present study was collected by using a questionnaire from the experts of the selected bank and analysis was performed by multiple regressions in SPSS and LISREL software package. The results showed that the factors like security, technological infrastructure and internal controls are affecting on the operational risks of e-banking but the accuracy of data, accessing to the systems, level of education and training have no effect on the operational risks of e-banking studied the elements that influence operational risk in e-banking. The data for this study was gathered through a questionnaire from specialists at the chosen bank, and the analysis was carried out using multiple regressions in the SPSS and LISREL software packages. The findings revealed that elements such as security, technological infrastructure, and internal controls have an impact on e-banking operational risks, but data accuracy, system access, and education and training have no impact.

Shalini (2016) in her paper titled “Performance of the Indian Banking Industry: A Comparison of Public and Private Sector Banks” aimed to examine the performance of India's banking industry using known financial parameters 46 scheduled commercial banks were researched using the purposive sample technique, and the business standard banking yearly database was combed for pertinent data. Both public and private sector banks were included in the sample and examined using four criteria (size, growth, and profitability) financial performance measures were created to separate profitability and soundness. The studies revealed that In terms of size and expansion, public and private sector banks were not that dissimilar. However, significant disparities in profitability and company soundness were discovered, indicating substantial expansion.

3. Data Analysis and Interpretation

While dealing with efficiency of banks, the primary question that hits mind of a researcher is that why customers, regulators and shareholders bother about efficiency of banks? Answer to this question varies based on the view point of different parties. From the regulators view, inefficient banks are facing more risk and have a high possibility of incurring losses. Moreover efficiency of banks is directly associated with the efficiency of the financial system. Failing which, the financial system cannot run smoothly and proficiently. When banking system deteriorates, the entire country’s financial system appears to be risky. From the customer’s view, only efficient banks can offer better services at reasonable rate. However from point of view of shareholders only efficient banks guarantee reasonable returns. From the point of view of bank managers only efficient banks will sustain and retain their market share, and inefficient ones will sooner or later be eliminated. As the banks that are efficient are able to compete better because of their lesser operational costs and can take business away from less proficient banks.

The operational efficiency of the selected public and private sector banks is measured using ratios from 2010-11 to 2020-21.

Table –1

Interest income/ Average working fund (II/AWF) in public and private sector banks

	Public Sector Banks					Private Sector Banks				
Bank	SBI	PNB	BOB	Canara	BOI	HDFC	ICICI	AXIS	Kotak	YES
2010-11	7.54	7.06	6.78	7.17	6.78	7.16	6.83	6.60	8.62	7.09
2012-13	7.45	7.50	7.18	7.61	7.23	8.36	7.72	7.42	9.00	7.70
2013-14	7.60	7.89	7.32	8.20	7.71	9.01	8.27	7.66	10.51	9.29
2014-15	7.57	8.67	7.42	8.56	8.09	10.32	7.98	8.42	10.75	10.05
2015-16	7.04	7.88	6.61	7.74	7.14	7.97	6.92	7.09	9.84	7.99
2016-17	7.15	8.00	6.97	7.68	6.95	7.97	6.75	7.16	9.75	8.47
2017-18	8.32	8.72	7.58	8.69	7.74	9.06	7.49	8.33	10.61	9.51
2018-19	8.25	8.94	7.34	8.67	7.62	9.50	7.81	8.68	10.77	9.60
2019-20	7.57	8.31	6.76	8.80	7.19	9.72	8.00	8.78	10.51	9.92
2020-21	7.61	8.00	6.62	8.88	6.81	9.59	8.19	8.81	10.31	9.90
Mean	7.61	8.10	7.06	8.20	7.33	8.87	7.60	7.90	10.07	8.95
CV	0.35	0.98	-0.17	1.32	-0.09	1.50	0.51	1.72	1.33	2.06
Growth	0.04	0.12	-0.02	0.16	-0.01	0.18	0.06	0.21	0.16	0.25
Rank	8	6	10	4	9	3	7	2	5	1

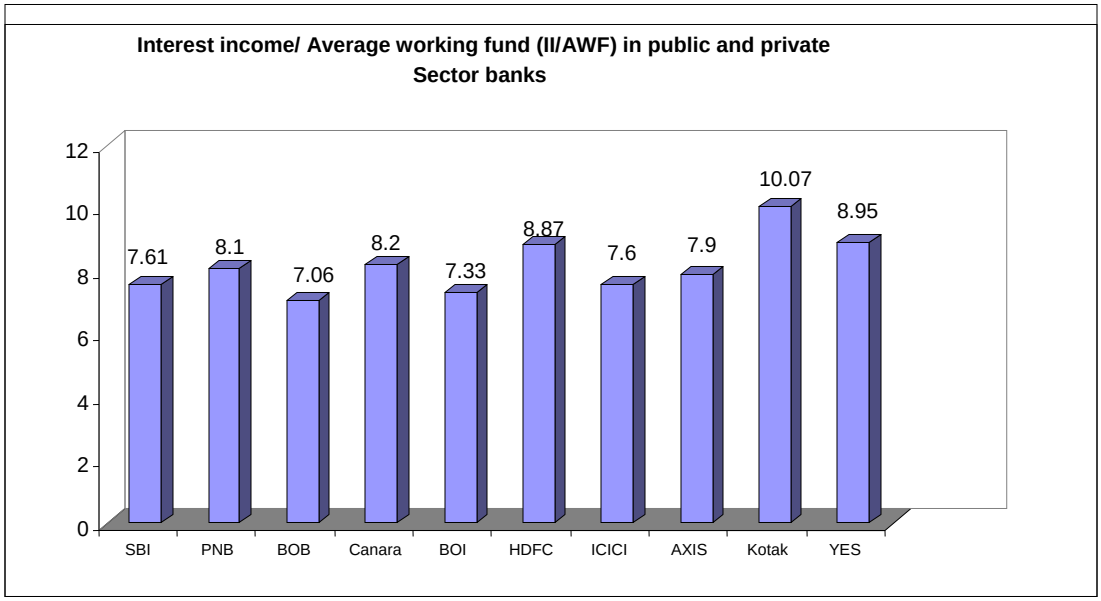
From the above table no.1 based on Interest income/ Average working fund(II/AWF) it was found, Kotak bank (10.07 percent) has occupied top position with its average value followed by Yes Bank (8.95 percent) and HDFC Bank (8.87 Percent) among all public and private sector banks. Bank of Baroda (7.06 percent) has least average in II/AWF among all banks under study. This bank is taking high risk, as their II/AWF found lowest. Out of private sector banks, Kotak bank (10.07 percent) has highest II/AWF and ICICI bank (7.60 percent) has lowest II/AWF. Whereas, out of public sector banks, Canara Bank (8.20 percent) has highest II/AWF and Bank of Baroda (7.06 percent) has lowest II/AWF. The II/AWF of public sector banks lies “between” 8.20 percent to 7.06 percent while private sector banks have range “between” 10.07 percent to 7.60 percent.

It is further observed that the highest growth rate of II/AWF found at Yes Bank (0.25 percent), while Bank of Baroda (-0.02) and Bank of India (-0.01) indicate negative growth rate in II/AWF among all banks. In the distribution, the ranks pertaining to II/AWF of the banks based on the growth rate shows first three ranks possessed by private sector banks i.e. Yes, Axis and HDFC followed by Canara and Kotak with 4^{th} & 5^{th} ranks.

The coefficient of variation hardly revealed the variation in II/AWF ratio. It shows that in private sector all banks i.e. HDFC, Yes, ICICI, Kotak and Axis banks have positive CV in II/AWF, whereas in public sector two banks i.e. BOI and BOB bank has negative CV in II/AWF. Therefore it can be concluded that most of the private sector banks II/AWF is better than the public sector banks.

Chart: 1

Interest Income to Average working fund ratio of selected public and private sector banks



Hypothesis Testing:

Null Hypothesis ($H0_1$):

There is no significance difference between Interest income/ Average working fund (Ratio) of selected public banks and private banks

Alternate Hypothesis ($H1_1$):

There is significance difference between Interest income/ Average working fund (Ratio) of selected public banks and private banks

Table – 2

The performance of public and private sector banks in Interest income/ Average working fund

Bank	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
SBI	10	7.61	0.41	0.13	7.32	7.90	7.04	8.32
PNB	10	8.10	0.58	0.18	7.68	8.51	7.06	8.94
BOB	10	7.06	0.35	0.11	6.80	7.31	6.61	7.58
CANARA	10	8.20	0.61	0.19	7.77	8.63	7.17	8.88
BOI	10	7.33	0.44	0.14	7.01	7.64	6.78	8.09
HDFC	10	8.87	0.98	0.31	8.17	9.57	7.16	10.32
ICICI	10	7.60	0.57	0.18	7.19	8.01	6.75	8.27
AXIS	10	7.90	0.81	0.25	7.32	8.47	6.60	8.81
KOTAK	10	10.07	0.75	0.24	9.53	10.61	8.62	10.77
YES	10	8.95	1.06	0.33	8.20	9.71	7.09	10.05
Total	100	8.17	1.09	0.11	7.95	8.38	6.60	10.77

According to the above table No.2, the average performance of Kotak bank (10.07) found highest value in interest income/ Average working fund against the Bank of Baroda has found lowest with an average of 7.06. On the other hand among the five-selected public sector banks, the highest average performance in interest income/ Average working fund among public sector banks observed by Canara Bank (8.20) and lowest performance observed by bank of Baroda (7.06). Whereas, highest average performance among private sector banks observed by the Kotak bank (10.07) and lowest performance observed by the ICIC Bank (7.60).

Table –3

The performance of public and private sector banks in Interest income/ Average working fund

ANNOVA	**Sum of Squares**	**Df**	**Mean Square**	**f**	**Sig.**
Between Groups	73.68	9	8.19	17.033**	0.000
Within Groups	43.26	90	0.48		
Total	116.94	99			

****Significant @ 1% level; *Significant @ 5% level.

From the above table no. 3 it was found that the level of difference between and within groups of different public and private sector banks in interest income/ Average working fund found

significant at 1 percent. Whereas in sum of squares between the groups is 73.68 and within the groups is 43.26 and the f-value is 17.033. This indicates that there is a significant difference between and within the groups of public and private sector banks in interest income/ Average working fund.

Table –4

Mean difference between public and private sector banks in Interest income/ Average working fund

Mean		Df	No of observe.		Std. Dev.		t-value	p-value
Public	Private		Public	private	Public	Private		
7.66	8.68	98	50	50	0.64	1.40	5.275**	0.000

******Significant @ 1% level; *Significant @ 5% level.

The table No. 4 shows the mean difference between public and private banks in interest income/average working fund. It shows that the average performance of interest income/average working fund of private sector banks (8.68) found significant higher than the public sector banks (7.66) and the respective standard deviations are 1.40 and 0.64. With this distribution of data is calculated t-value is 5.275 found 1 percent significant. This shows that there is a significance difference between public and private sector banks in performance of interest income/average working fund, where private sector banks mean value is higher than the public sector banks mean value.

Table –5

7.3 Non- interest income/Average working fund (NII/AWF) in public and private sector banks

	Public Sector Banks					Private Sector Banks				
Bank	SBI	PNB	BOB	Canara	BOI	HDFC	ICICI	AXIS	Kotak	YES
2010-11	1.56	0.94	1.08	1.08	1.14	1.80	2.00	1.67	2.61	3.57
2012-13	1.09	0.68	0.91	0.97	1.43	1.84	1.99	1.64	1.89	2.55
2013-14	1.35	1.11	1.47	1.48	1.32	2.03	2.37	1.96	1.92	2.57
2014-15	1.51	1.31	1.36	1.16	1.51	2.08	1.95	2.25	1.46	2.18
2015-16	1.48	1.33	1.11	1.18	1.05	1.96	2.01	2.40	1.90	1.94
2016-17	1.39	1.07	0.89	0.90	0.84	1.73	1.73	2.19	1.43	1.31
2017-18	1.12	1.00	0.87	0.82	0.90	1.88	1.68	2.05	1.68	1.49
2018-19	1.11	0.90	0.76	0.80	0.90	1.86	1.63	2.09	1.55	1.46
2019-20	1.03	0.88	0.78	0.87	0.66	1.87	1.89	2.12	1.68	1.71
2020-21	1.13	1.02	0.68	0.92	0.81	1.78	2.03	2.08	2.15	1.75
Mean	1.48	1.02	0.97	1.00	1.04	1.88	1.93	2.05	1.81	2.03
CV	-0.34	-0.01	-0.44	-0.29	-0.56	-0.08	-0.26	0.34	-0.33	-1.56
Growth	-0.04	0.00	-0.05	-0.04	-0.07	-0.01	-0.03	0.04	-0.04	-0.19
Rank	5	2	8	6	9	3	4	1	7	10

In the above table no. 5 based of Non-Interest income/ Average working fund(NII/AWF)it was found, Axis bank (2.05 percent) has occupied top position with its average value followed by Yes Bank (2.03 percent) and ICICI Bank (1.93 Percent) among all public and private sector banks. Bank of Baroda (0.97 percent) has least average in NII/AWF among all banks under study. This bank is taking high risk, as their NII/AWF found lowest. Out of private sector banks, Axis bank (2.05 percent) has highest NII/AWF and Kotak bank (1.81 percent) has lowest NII/AWF. Whereas, out of public sector banks, State Bank of India (1.48 percent) has highest NII/AWF and Bank of Baroda (0.97 percent) has lowest NII/AWF. The II/AWF of public sector banks lies “between” 1.48 percent to 0.97 percent while private sector banks have range “between” 2.05 percent to 1.81 percent.

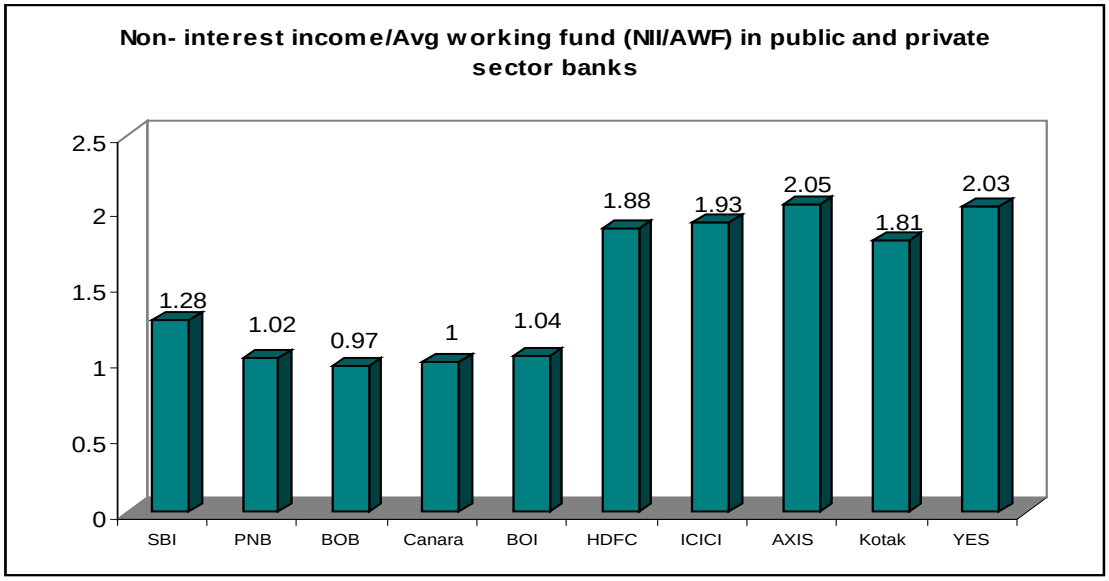
It is further observed that the highest growth rate of NII/AWF found at Axis Bank (0.04 percent), while Yes Bank (-0.19) and Bank of India (-0.07) are indicating highest negative growth rate in NII/AWF among all banks. In the distribution, the ranks pertaining to NII/AWF of the banks

based on the growth rate shows 1st ranks possessed by private sector bank i.e. Axis followed by PNB and HDFC with 2nd & 3rd ranks.

The coefficient of variation revealed hardly the variation exists with respect to the above-mentioned indictor. It shows that in private sector only one bank i.e. Axis bank indicate positive CV in NII/AWF, whereas in public sector all banks i.e. SBI, PNB, BOI, Canara and BOB indicate negative CV in NII/AWF. Most of the private sector banks NII/AWF was found to be better than the public sector banks.

Chart: 2

Non- Interest income to Average Working fund Ratio of selected public and private sector banks



Hypothesis Testing:

Null Hypothesis ($H0_2$):

There is no significance difference between Non-Interest income/ Average working fund (Ratio) of selected public banks and private banks

Alternate Hypothesis ($H1_2$):

There is significance difference between Non- Interest income/ Average working fund (Ratio) of selected public banks and private banks

Table – 6

The performance of public and private sector banks in Non- interest income/Average working fund

Bank	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
SBI	10	1.48	0.20	0.06	1.13	1.42	1.03	1.56
PNB	10	1.02	0.20	0.06	0.88	1.16	0.68	1.33
BOB	10	0.97	0.23	0.07	0.81	1.13	0.68	1.36
CANARA	10	1.00	0.17	0.05	0.88	1.12	0.80	1.48
BOI	10	1.04	0.26	0.08	0.85	1.42	0.66	1.51
HDFC	10	1.88	0.11	0.03	1.80	1.96	1.73	2.08
ICICI	10	1.93	0.21	0.07	1.77	2.08	1.63	2.37
AXIS	10	2.05	0.24	0.08	1.87	2.22	1.64	2.40
KOTAK	10	1.81	0.38	0.12	1.53	2.08	1.46	2.61
YES	10	2.03	0.71	0.22	1.53	2.54	1.49	3.57
Total	100	1.50	0.54	0.05	1.39	1.61	0.66	3.57

According to table No.6, the average performance of Axis bank (2.05) found highest value in non-interest income/ Average working fund against the Bank of Baroda has found lowest with an average of 0.97. On the other hand among the five-selected public sector banks, the highest average performance in non-interest income/ Average working fund among public sector banks observed by State Bank of India (1.48) and lowest performance observed by bank of Baroda (0.97). Whereas, highest average performance among private sector banks observed by the Axis bank (2.05) and lowest performance observed by the Kotak Bank (1.81).

Table –7

Level of significance between and within groups of public and private sector banks in Non-interest income/Average working fund

ANNOVA	Sum of Squares	Df	Mean Square	f	Sig.
Between Groups	20.29	9	2.25	22.695**	0.000

Within Groups	8.94	90	0.10		
Total	29.23	99			

**Significant @ 1% level; *Significant @ 5% level.

From the above table no. 7 it was observed that the level of difference between and within groups of different public and private sector banks in non-interest income/ Average working fund found significant at 1 percent. Whereas in sum of squares between the groups is 20.29 and within the groups is 8.94 and the f-value is 22.695. This indicates that there is a significant difference between and within the groups of public and private sector banks in non-interest income/ Average working fund.

Table – 8

Mean difference between public and private sector banks in Non- interest income/Average working fund

Mean		**Df**	**No of observe.**		**Std. Dev.**		**t-value**	**p-value**
Public	**Private**		**Public**	**private**	**Public**	**Private**		
1.06	1.94	98	50	50	0.23	0.39	13.775**	0.000

**Significant @ 1% level; *Significant @ 5% level.

An analysis of the above table no. 8 it was found that mean difference between public and private banks in non-interest income/average working fund. It shows that the average performance of non-interest income/average working fund of private sector banks (1.94) found significant higher than the public sector banks (1.06) and the respective standard deviations are 0.39 and 0.23. With this distribution of data is calculated t-value is 13.775 found 1 percent significant. This infers there is a major difference between public and private sector banks in performance of non-interest income/average working fund, where private sector banks mean value is higher than the public sector banks mean value.

Table –9

Total Asset turnover ratio (TATR) in public and private sector banks

	Public Sector Banks					Private Sector Banks				
Bank	SBI	PNB	BOB	Canara	BOI	HDFC	ICICI	AXIS	Kotak	YES
2010-11	0.08	0.07	0.07	0.07	0.07	0.09	0.08	0.08	0.11	0.10
2012-13	0.08	0.08	0.07	0.08	0.08	0.10	0.10	0.09	0.11	0.10
2013-14	0.09	0.09	0.08	0.09	0.09	0.11	0.11	0.10	0.12	0.11
2014-15	0.09	0.10	0.08	0.09	0.09	0.13	0.10	0.11	0.11	0.12
2015-16	0.09	0.09	0.08	0.09	0.08	0.10	0.09	0.09	0.11	0.10
2016-17	0.07	0.08	0.07	0.08	0.07	0.08	0.07	0.07	0.09	0.08
2017-18	0.08	0.09	0.07	0.09	0.08	0.09	0.08	0.08	0.11	0.10
2018-19	0.08	0.09	0.07	0.09	0.08	0.10	0.08	0.09	0.11	0.10
2019-20	0.08	0.08	0.06	0.09	0.07	0.09	0.08	0.08	0.10	0.10
2020-21	0.08	0.08	0.06	0.09	0.07	0.09	0.08	0.08	0.10	0.09
Mean	0.08	0.09	0.07	0.09	0.08	0.10	0.09	0.09	0.11	0.10
CV	-0.01	0.00	-0.01	0.01	-0.01	-0.01	-0.02	-0.01	-0.01	-0.01
Growth	-0.06	0.03	-0.15	0.15	-0.10	-0.16	-0.22	-0.14	-0.14	-0.13
Rank	3	2	8	1	4	9	10	7	6	5

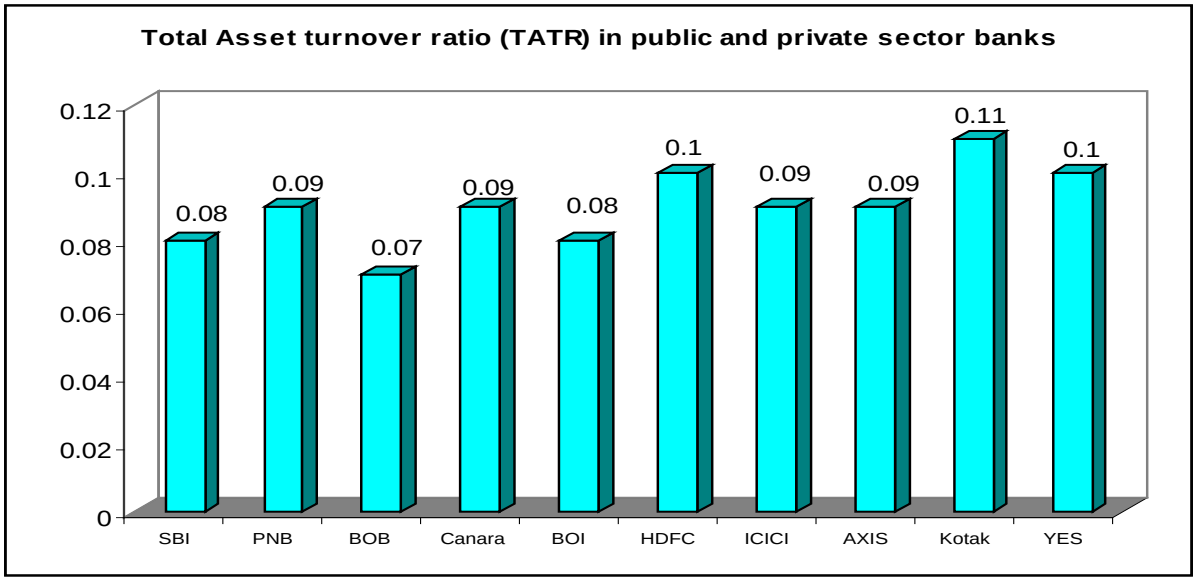
The above table no.9 Total Asset turnover ratio (TATR) it was found, Kotak bank (0.11 percent) has occupied top position with its average value followed by Yes Bank (0.10 percent) and HDFC Bank (0.10 Percent) among all public and private sector banks. Bank of Baroda (0.07 percent) has least average in TATR among all banks under study. This bank is taking high risk, as their TATR found lowest. Out of private sector banks, Kotak bank (0.11 percent) has highest TATR and Axis bank (0.09 percent) has lowest TATR. Whereas, out of public sector banks, Punjab National bank (0.09 percent) has highest TATR and Bank of Baroda (0.07 percent) has lowest TATR. The TATR of public sector banks lies “between” 0.09 percent to 0.07 percent while private sector banks have range “between” 0.11 percent to 0.09 percent.

It is further observed that the highest growth rate of TATR found at Canara Bank (0.15 percent), while ICICI Bank (-0.22) and HDFC Bank (-0.16) has highest negative growth rate in TATR among all banks. In the distribution, the ranks pertaining to TATR of the banks based on the growth rate shows first four ranks possessed by public sector banks i.e. Canara, PNB, SBI and BOI followed by Yes and Kotak with 5^{th} & 6^{th} ranks.

The coefficient of variation revealed hardly the variation is exists with respect to the above-mentioned indictor. It shows that in private sector all banks i.e. HDFC, ICICI, Kotak, Axis and Yes banks indicate negative CV in TATR, whereas in public sector two banks i.e. PNB and Canara banks are indicate positive CV in TATR. Most of the public sector banks TATR is better than the private sector banks.

Chart: 3

Total Asset turnover ratio of selected public and private sector banks



Hypothesis Testing:

Null Hypothesis ($H0_3$):

There is no significance difference between Total Asset turnover ratio (Ratio) of selected public banks and private banks

Alternate Hypothesis ($H1_3$):

There is significance difference between Total Asset turnover ratio (Ratio) of selected public banks and private banks

Table –10

The performance of public and private sector banks in Total asset turnover ratio

Bank	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
SBI	10	0.08	0.01	0.00	0.08	0.09	0.07	0.09
PNB	10	0.09	0.01	0.00	0.08	0.09	0.07	0.10
BOB	10	0.07	0.01	0.00	0.07	0.08	0.06	0.08
CANARA	10	0.09	0.01	0.00	0.08	0.09	0.07	0.09
BOI	10	0.08	0.01	0.00	0.07	0.08	0.07	0.09
HDFC	10	0.10	0.01	0.00	0.09	0.11	0.08	0.13
ICICI	10	0.09	0.01	0.00	0.08	0.10	0.07	0.11
AXIS	10	0.09	0.01	0.00	0.08	0.10	0.07	0.11
KOTAK	10	0.11	0.01	0.00	0.10	0.11	0.09	0.12
YES	10	0.10	0.01	0.00	0.09	0.11	0.08	0.12
Total	100	0.09	0.01	0.00	0.09	0.09	0.06	0.13

The table No. 10 is representing the average performance of Kotak bank (0.11) found highest value in total asset turnover ratio against the Bank of Baroda has found lowest with an average of 0.07. On the other hand among the five-selected public sector banks, the highest average performance in total asset turnover ratio among public sector banks observed by Punjab National Bank (0.09) and lowest performance observed by Bank of Baroda (0.07). Whereas, highest average performance among private sector banks observed by the Kotak bank (0.11) and lowest performance observed by the ICICI Bank (11.89).

Table –11

Level of significance between and within groups of public and private sector banks in Total asset turnover ratio

ANNOVA	**Sum of Squares**	**Df**	**Mean Square**	**f**	**Sig.**
Between Groups	0.01	9	0.00	12.307**	0.000
Within Groups	0.01	90	0.00		
Total	0.02	99			

****Significant @ 1% level; *Significant @ 5% level.

From the table No.11 it is found that the level of difference between and within groups of different public and private sector banks in total asset turnover ratio found significant at one percent. Though sum of squares between the groups is 0.01 and within the groups is 0.01 and the f-value is 12.307. This indicates that there is a significant difference between and within the groups of public and private sector banks in total asset turnover ratio.

Table –12

Mean difference between public and private sector banks in total asset turnover ratio

Mean		Df	No of observe.		Std. Dev.		t-value	p-value
Public	Private		Public	private	Public	Private		
0.08	0.10	98	50	50	0.01	0.01	6.683**	0.000

**Significant @ 1% level; *Significant @ 5% level.

An analysis of the given above table no.12 it is found that mean difference between public and private banks in total asset turnover ratio. It shows that the average performance of total asset turnover ratio of private sector banks (0.10) found significant higher than the public sector banks (0.08) and the respective standard deviations are 0.01 and 0.01. With this distribution of data is calculated t-value is 6.683 found one percent significant. This infers there is a significant difference between public and private sector banks in performance of total asset turnover ratio, where private sector banks mean value is higher than the public sector banks mean value.

Table –13

Asset turnover ratio (ATR) in public and private sector banks

	Public Sector Banks					Private Sector Banks				
Bank	SBI	PNB	BOB	Canara	BOI	HDFC	ICICI	AXIS	Kotak	YES
2010-11	0.09	0.08	0.07	0.08	0.08	0.10	0.09	0.09	0.12	0.11
2012-13	0.09	0.08	0.08	0.08	0.09	0.12	0.11	0.10	0.12	0.11
2013-14	0.10	0.09	0.09	0.10	0.09	0.13	0.12	0.10	0.13	0.13
2014-15	0.10	0.11	0.09	0.10	0.10	0.14	0.11	0.11	0.13	0.14
2015-16	0.09	0.10	0.08	0.09	0.08	0.11	0.10	0.10	0.12	0.13
2016-17	0.08	0.08	0.07	0.08	0.07	0.09	0.07	0.07	0.10	0.09
2017-18	0.09	0.09	0.08	0.09	0.08	0.10	0.08	0.09	0.11	0.10
2018-19	0.09	0.09	0.07	0.09	0.08	0.11	0.08	0.09	0.11	0.10
2019-20	0.09	0.09	0.07	0.09	0.08	0.10	0.08	0.09	0.11	0.10
2020-21	0.08	0.08	0.06	0.09	0.07	0.10	0.08	0.09	0.10	0.10
Mean	0.09	0.09	0.08	0.09	0.08	0.11	0.09	0.09	0.12	0.11
CV	-0.01	0.00	-0.02	0.00	-0.01	-0.02	-0.03	-0.01	-0.02	-0.02
Growth	-0.11	-0.01	-0.18	0.04	-0.17	-0.23	-0.38	-0.13	-0.26	-0.28
Rank	3	2	6	1	5	7	10	4	8	9

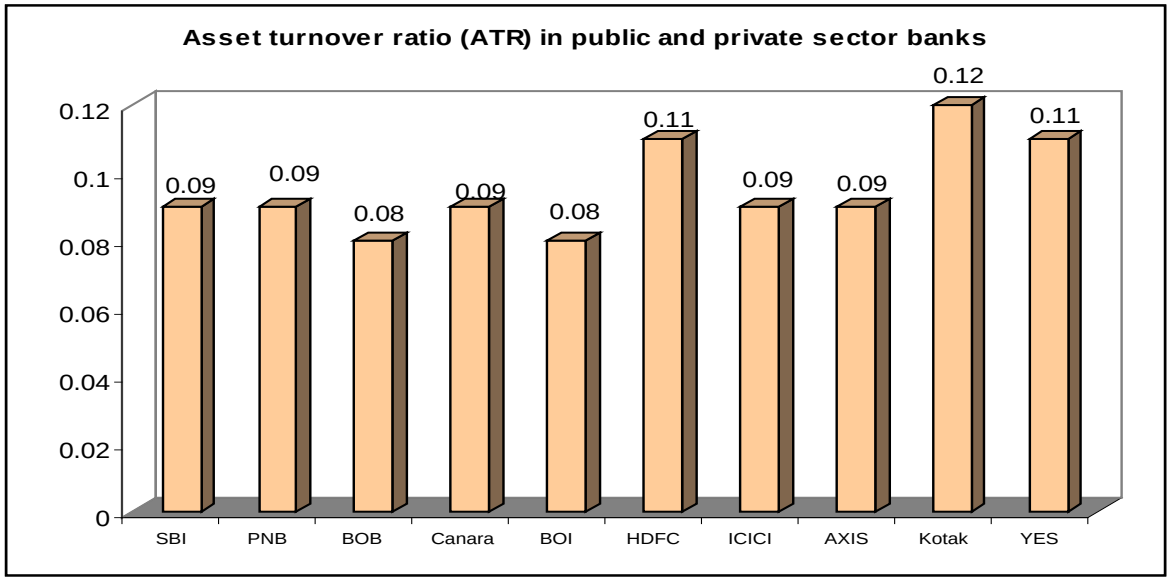
From the above table no. 13 it was observed from the mean value of different banks of Asset turnover ratio found, Kotak bank (0.12 percent) has occupied top position with its average value followed by Yes Bank (0.11 percent) and HDFC Bank (0.11 Percent) among all public and private sector banks. Bank of Baroda (0.08 percent) has least average in ATR among all banks under study. This bank is taking high risk, as their ATR found lowest. Out of private sector banks, Kotak bank (0.12 percent) has highest ATR and ICICI bank (0.09 percent) has lowest ATR. Whereas, out of public sector banks, Punjab National bank (0.09 percent) has highest ATR and Bank of Baroda (0.08 percent) has lowest ATR. The ATR of public sector banks lies "between" 0.09 percent to 0.08 percent while private sector banks have range "between" 0.12 percent to 0.09 percent.

An analysis of the growth rate of ATR found at Canara Bank (0.04 percent), while ICICI Bank (-0.38) and Yes Bank (-0.28) indicate highest negative growth rate in ATR among all banks. Ranking based on ATR on the basis of growth rate of banks shows that first three ranks are possessed by private sector bank i.e. Canara, PNB and SBI followed by Axis and BOI with 4^{th} & 5^{th} ranks.

The coefficient of variation revealed hardly the variation exists with respect to the above-mentioned indictor. It shows that in private sector all banks i.e. HDFC, ICICI, Kotak, Axis and Yes banks indicate negative CV in ATR, whereas in public sector two banks i.e. PNB and Canara banks indicate positive CV in ATR. Most of the public sector banks ATR is better than the private sector banks.

Chart: 4

Asset turnover ratio of selected public and private sector banks



Hypothesis Testing:

Null Hypothesis ($H0_4$):

There is no significance difference between Asset turnover (Ratio) of selected public banks and private banks

Alternate Hypothesis ($H1_4$):

There is significance difference between Asset turnover (Ratio) of selected public banks and private banks

Table –14

The performance of public and private sector banks in Asset turnover ratio

Bank	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
SBI	10	0.09	0.01	0.00	0.09	0.09	0.08	0.10
PNB	10	0.09	0.01	0.00	0.08	0.10	0.08	0.11
BOB	10	0.08	0.01	0.00	0.07	0.08	0.06	0.09
CANARA	10	0.09	0.01	0.00	0.08	0.09	0.08	0.10
BOI	10	0.08	0.01	0.00	0.08	0.09	0.07	0.10
HDFC	10	0.11	0.02	0.00	0.10	0.12	0.09	0.14
ICICI	10	0.09	0.02	0.01	0.08	0.10	0.07	0.12
AXIS	10	0.09	0.01	0.00	0.09	0.10	0.07	0.11
KOTAK	10	0.12	0.01	0.00	0.11	0.12	0.10	0.13
YES	10	0.11	0.02	0.01	0.10	0.12	0.09	0.14
Total	100	0.09	0.02	0.00	0.09	0.10	0.06	0.14

According to the above table no.14 it was found the average performance of Kotak bank (0.12) found highest value in asset turnover ratio against the Bank of Baroda has found lowest with an average (0.08). On the other hand among the five-selected public sector banks, the highest average performance in asset turnover ratio among public sector banks observed by Punjab National Bank (0.09) and lowest performance observed by Bank of Baroda (0.08). Whereas, highest average performance among private sector banks observed by the Kotak bank (0.12) and lowest performance observed by the Axis Bank (0.09).

Table –15

Level of significance between and within groups of public and private sector banks in Asset turnover ratio

ANNOVA	Sum of Squares	Df	Mean Square	f	Sig.
Between Groups	0.02	9	0.00	11.979**	0.000
Within Groups	0.01	90	0.00		
Total	0.03	99			

****Significant @ 1% level; *Significant @ 5% level.

From the above table no.15 it is observed that the level of difference between and within groups of different public and private sector banks in asset turnover ratio found significant at 1 percent. Whereas in sum of squares between the groups is 0.02 and within the groups is 0.01 and the f-value is 11.979. This indicates that there is a significant difference between and within the groups of public and private sector banks in asset turnover ratio.

Table –16

Mean difference between public and private sector banks in asset turnover ratio

Mean		Df	No of observe.		Std. Dev.		t-value	p-value
Public	Private		Public	private	Public	Private		
0.09	0.10	98	50	50	0.01	0.02	6.847**	0.000

**Significant @ 1% level; *Significant @ 5% level.

An analysis of the given above table no.16 found mean difference between public and private banks in total asset turnover ratio. It shows that the average performance of total asset turnover ratio of private sector banks (0.10) found significant higher than the public sector banks (0.09) and the respective standard deviations are 0.02 and 0.01. With this distribution of data is calculated t-value is 6.847 found 1 percent significant. This infers that there is a significant difference between public and private sector banks in performance of total asset turnover ratio, where private sector banks mean value is higher than the public sector banks mean value.

Table –17

Business per employee (BPE) in public and private sector banks

	Public Sector Banks					Private Sector Banks				
Bank	SBI	PNB	BOB	Canara	BOI	HDFC	ICICI	AXIS	Kotak	YES
2010-11	217.00	330.92	396.00	441.57	381.00	758.00	905.00	1020.00	352.00	848.08
2012-13	237.00	407.41	555.00	548.76	498.00	607.00	1027.00	1024.00	383.91	530.50
2013-14	373.00	504.52	710.00	609.41	652.00	506.00	1008.00	1117.00	383.84	683.12
2014-15	474.00	654.92	914.00	780.17	833.00	446.00	1154.00	1060.00	347.00	988.36
2015-16	446.00	807.95	981.00	982.58	1011.00	590.00	765.00	1111.00	487.00	1623.84
2016-17	385.00	1017.80	1333.00	1228.18	1284.00	653.00	735.00	1366.00	535.00	2220.25
2017-18	531.00	113.20	146.60	137.44	136.00	65.40	70.80	127.60	61.30	174.77
2018-19	645.00	116.51	168.90	142.02	158.20	75.00	73.50	121.50	68.60	177.42
2019-20	485.00	398.00	186.50	143.84	196.30	89.00	74.70	123.00	67.80	155.81
2020-21	602.00	404.00	188.90	14.35	20.69	101.00	83.20	13.71	705.00	168.60
Mean	439.50	475.52	557.99	502.83	517.02	389.04	589.62	708.38	339.15	757.08
CV	333.55	-138.18	-454.96	-534.95	-482.08	-638.64	-1100.72	-1144.17	-71.05	-655.55
Growth	40.43	-16.75	-55.15	-64.84	-58.43	-77.41	-133.42	-138.69	-8.61	-79.46
Rank	1	3	4	6	5	7	9	10	2	8

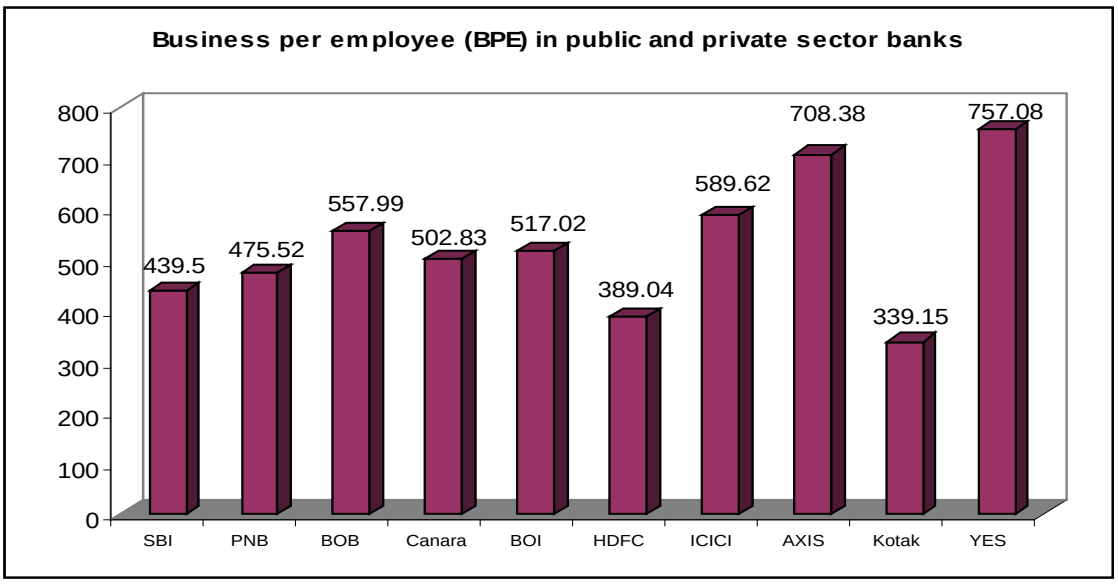
The table no.17 shows that the given data of Business per employee found, Yes bank (757.08 percent) has occupied top position with its average value followed by Axis Bank (708.38 percent) and ICICI Bank (589.62 Percent) among all public and private sector banks. Kotak Bank (339.15 percent) has least average in BPE among all banks under study. This bank is taking high risk, as their BPE found lowest. Out of private sector banks, Yes bank (757.08 percent) has highest BPE and Kotak bank (339.15 percent) has lowest BPE. Whereas, out of public sector banks, Bank of Baroda (557.99 percent) has highest BPE and State Bank of India (439.50 percent) has lowest BPE. The BPE of public sector banks lies “between” 557.99 percent to 439.50 percent while private sector banks have range “between” 757.08 percent to 339.15 percent.

When we look in to the growth rate of BPE it was found State Bank of India (40.43 percent), while Axis Bank (-138.69) and ICICI Bank (-133.42) are indicate highest negative growth rate in BPE among all banks. In the distribution, the ranks pertaining to BPE of the banks based on the growth rate shows 1st, 3rd, 4th, 5th and 6th ranks possessed by public sector bank i.e. SBI, PNB, BOB, BOI and Canara then 2nd rank is possessed by public sector bank i.e. Kotak bank.

The coefficient of variation revealed hardly the variation exists with respect to the above-mentioned indictor. It shows that in private sector all banks i.e. HDFC, ICICI, Kotak, Axis and Yes banks indicate negative CV in BPE, whereas in public sector only one bank i.e. SBI bank is indicate positive CV in BPE. Most of the public sector banks BPE is better than the private sector banks.

Chart: 5

Business per employee ratio of selected public and private sector banks



Hypothesis Testing:

Null Hypothesis ($H0_5$):

There is no significance difference between Business per employee (Ratio) of selected public banks and private banks

Alternate Hypothesis ($H1_5$):

There is significance difference between Business per employee (Ratio) of selected public banks and private banks

Table –18

The performance of public and private sector banks in business per employee

Bank	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
SBI	10	439.50	140.72	44.50	338.84	540.16	217.00	645.00
PNB	10	475.52	285.67	90.34	271.17	679.88	113.00	1018.00
BOB	10	557.99	415.07	131.46	261.07	854.91	147.00	1333.00
CANARA	10	502.83	405.74	128.31	212.58	793.08	14.00	1228.00
BOI	10	517.02	420.63	133.01	216.12	817.92	21.00	1284.00
HDFC	10	389.04	276.28	87.37	191.40	586.68	65.00	758.00
ICICI	10	589.62	458.67	145.04	261.51	917.73	71.00	1154.00
AXIS	10	708.38	536.33	169.60	324.71	1092.05	14.00	1366.00
KOTAK	10	339.15	216.62	68.50	184.18	494.11	61.00	705.00
YES	10	757.08	698.70	220.95	257.25	1256.90	156.00	2220.00
Total	100	527.61	415.39	41.54	445.19	610.04	14.00	2220.00

According to the above table no.18, the average performance of Yes bank (757.08) found highest value in business per employee against the Kotak bank has found lowest with an average of (339.15). On the other hand among the five-selected public sector banks, the highest average performance in business per employee among public sector banks observed by Bank of Baroda (557.99) and lowest performance observed by State bank of India (439.50). Whereas, highest average performance among private sector banks observed by the Yes bank (757.08) and lowest performance observed by the Kotak Bank (339.15).

Table – 19

Level of significance between and within groups of public and private sector banks in business per employee

ANNOVA	Sum of Squares	Df	Mean Square	f	Sig.
Between Groups	1560237.73	9	173359.75	1.005	0.442
Within Groups	15522334.97	90	172470.39		
Total	17082572.70	99			

****Significant @ 1% level; *Significant @ 5% level.

From the table No.19 it is observed that the level of difference between and within groups of different public and private sector banks in business per employee not found significant because the significant value is 0.442. Whereas in sum of squares between the groups is 1560237.73 and within the groups is 15522334.97 and the f-value is 1.005. This shows that there is no significant difference between and within the groups of public and private sector banks in business per employee.

Table – 20

Mean difference between public and private sector banks in business per employee

Mean		Df	No of observe.		Std. Dev.		t-value	p-value
Public	Private		Public	private	Public	Private		
498.60	556.70	98	50	50	338.55	481.90	0.698	0.487

**Significant @ 1% level; *Significant @ 5% level.

The table No. 20 found mean difference between public and private banks in business per employee. It shows that the average performance of business per employee of private sector banks (556.70) found significant higher than the public sector banks (498.60) and the respective standard deviations are 481.90 and 338.55. With this distribution of data is calculated t-value is 0.698, hear not found significant because p- value is 0.487. This infers that there is no major difference between public and private sector banks in performance of business per employee, where private sector banks mean value is higher than the public sector bank mean value

Conclusion

In this section ratios were employed to measure the operational efficiency of selected public and private sector bank for a period of ten years i.e. from 2010-11 to 2020-21. From the study it is observed that operational efficiency of private sector banks is better compared to public sector banks in this tenure. Through the results it is found that Yes bank is more efficient than other selected commercial banks followed by Axis Bank, Kotak Mahindra Bank, HDFC Bank, ICICI Bank, Canara Bank, Punjab National Bank, State Bank of India, Bank of India and the bank which is facing more operational risk is Bank of Baroda.

The study highlights that operational risk is affecting commercial banks profitability as without a sound and efficient banking system, the financial system cannot function smoothly and efficiently. However when a nation's payment system is in risk the banking system also fails.

Moreover, banks tend to downplay the magnitude of risks connected with reputational issues and lost income opportunities and credit defaults caused by operational risk events.

However, well-structured and efficiently run operational risk management approach offers a number of benefits. With accurate practice in place, banks can allocate more capital in income generating activities, can provide new insight for better decision making, bring down the cost of funds, lowering operating costs, gain customers and employees satisfaction, last and very important role is to assure regulatory compliance which would lead to competitive advantage.

Therefore by implementing a comprehensive operational risk management it would make banks more efficient, transparent, Profitable and sustainable which would result in growth of banks.

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